Amendments to the Drawings:

The attached sheet of drawings includes:

A replacement sheet for FIGURE 14 that is amended to recite "PRIOR ART" intended to be suitable for examination.

Remarks/Arguments

With reference to the Office Action of December 14, 2004, Applicants offer the following remarks.

Objections to the Figure

Applicants acknowledge the objections to Figure 14 and submit a replacement sheet therefore reciting that it illustrates the prior art.

Status of the Claims

Applicants have significantly amended the claims to particularly point out and characterize their claimed invention. This represents a sincere, good faith effort to advance the prosecution of this Application. Entry thereof is proper.

Twenty one claims were originally presented for examination. Four claims were allowed, eight claims were rejected, and eight were withdrawn from consideration as drawn to non-elected inventions. Nine claims are pending, four of which have been allowed.

Confirmation of Election

Applicants confirm the election of the Claims of Group I, claims 1-6, 12-25, and 19-20.

The Office Action of December 14, 2004

In the Office Action of December 12, 2004, Figure 14 was objected to for failing to include the legend "Prior Art." This correction has been made and a Replacement Sheet is submitted herewith.

Claims 1-2 and 5-6 were rejected under 35 USC 102(b) as anticipated by US Patent 6,400,855 to Li et al. for **N X N Optical Switching Array Device And System.**, and Claims 3 and 4 were rejected under 35 USC 103 as being unpatentable over Li. It is stated in the Office Action that Li teaches an optical switch (Figures 7-8) for connecting light beams by deflection, comprising input light emitting devices (804-807) arranged in a plane, output optical waveguides (814-817) for receiving light beams from the input light emitting devices (804-807) that are arranged to intercept each other and an optical bend section (808-811 with 812-813) that is disposed between the light emitting devices (804-807) and the optical waveguides (814-817) and includes a plurality of aspherical concave lenses (citing column 10, lines 35-36)[1] (808-811 or prism 702 and lens 703), each lens having a different radii with respect to the center of the lenses to the surface of the lenses, and that lie outward from the surface of the optical (703 or 808-811 with 812 and 813) formed in accordance with the number of the light emitting devices (804-807) and the number of the output waveguides.(814-817).

Claim 19 was rejected under 35 USC 102(b) as anticipated by U.S. Patent 6,034,797 to Ju for **Prism-Type Objective Lens For The Pickup Head Of An Optical Disc Drive Capable Of Driving Two Types Of Optical Discs.** It is stated in the Office Action that Ju teaches a prism type lens (Figure 6A) used in a module linking optical signals comprising two optical surfaces (surfaces 62 and 64) through which the light beams pass (as shown in Figure 7); and the aspherical lenses (62 and 64) with different radii.

Claims 12-15 were allowed.

Claims 7-11, 16-18, and 21 were withdrawn from consideration as being directed to non-elected inventions.

The Art of Record

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[1] "In one embodiment optical input lenses 808, 809, 810, 811 may be configured as concave lenses operable to optically communicate a signal incident to optical inputs 804, 805, 806, 807 respectively."

US Patent 6,400,855 to Li et al. for **N X N Optical Switching Array Device And System** describes an N X N optical switching array device and system are disclosed. In one aspect, an optical switching device for communicating optical signals is described. The device includes a plurality of optical inputs operable to communicate optical signals, a plurality of optical outputs optically coupled to the optical inputs and at least one thermo-optic array optically coupled to the plurality of optical inputs and the plurality of optical outputs. The device further includes a thermo-optical array operable to deflect an optical signal from one of the plurality of optical inputs to one of the plurality of optical outputs in response to a temperature differential.

U.S. Patent 6,034,797 to Ju for **Prism-Type Objective Lens For The Pickup Head Of An Optical Disc Drive Capable Of Driving Two Types Of Optical Discs** describes a prism-type objective lens is provided for use in the pickup head of an optical disc drive capable of driving two types of optical discs such as a CD and a DVD. The prism-type objective lens allows the pickup head to be made more compact in size with reduced structural complexity, and also allows the pickup head to read data from two different types of optical discs. The prism-type objective lens includes a prism having a cross section substantially in the shape of a right triangle, a front aspherical plano-convex lens, and a rear aspherical plano-convex lens, where the planar surface of each lens is attached to one or the other of the leg sides of the prism. The hypotenuse side of the prism can be formed with two aperture areas where different reflective layers are coated. Alternatively, the hypotenuse side of the prism can be formed with a reflective HOE layer that allows the laser beam incident on it and reflected from it to be diffracted into two beams which are focused at different points. Either manner allows the pickup head to read data from two different types of optical discs

Applicants' Claimed Invention

Applicants have amended the claims (claim 1 is exemplary) to recite:

1. An optical link module for connecting light beams by deflection, comprising:

light emitting devices arranged in a planar manner on a surface;

optical waveguides on a surface for receiving light beams from the light emitting devices; and

an optical bend prism which is disposed between the light emitting devices and the optical waveguides and includes a plurality of aspherical concave lenses protruding outwardly from and integral to an optical surface of the optical bend prism formed in accordance with the number of the light emitting devices and the number of the optical waveguides, wherein the surface on which light emitting devices are formed and the surface on which the optical waveguides are formed are disposed to intersect with each other.

Where the operative optical element is now characterized as

an optical bend prism

--which is disposed between the light emitting devices and the optical waveguides,

--and includes a plurality of aspherical concave lenses;

-----the aspherical concave lenses

--------protrude outwardly from

--------and integral to

-----an optical surface of the optical bend prism,

----the aspherical concave lenses are formed in accordance with the number of the light emitting devices and the number of the optical waveguides,

-- the aspherical lenses include a plurality of coaxial spherical surfaces having different radii (in claim 2)

--the surface on which light emitting devices are formed and the surface on which the optical waveguides are formed are disposed to intersect with each other.

Discussion

The overarching issue is whether the claims, as so limited are anticipated by Li, or obvious in view of Li or Ju.

The claimed combination of features is neither taught nor suggested by Li or Ju.

Claim 1 and claims dependent thereon. Turning to the limitation in claim 1 of

> "an optical bend prism which is disposed between the light emitting devices and the optical waveguides and includes a plurality of aspherical concave lenses protruding outwardly from and integral to an optical surface of the optical bend prism formed in accordance with the number of the light emitting devices and the number of the optical waveguides"

The limitation that the "aspherical concave lenses (are) protruding outwardly from and integral to an optical surface of the optical bend prism" is not taught by Li. In Figure 7 of Li, described at column 9, line 59, to column 10, line 20[2]. The Figures and narrative clearly show and describe that neither lenses 702 nor lens 704 are "protruding outwardly from and integral to an optical surface of the optical bend prism" 703.

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[2] FIG. 7 is an illustration of a multiple input thermo-optic N.times.N deflection system for switching optical signals in accordance with the teachings of the present invention. The system, illustrated generally at 700, includes a plurality of optical inputs shown collectively at 701 and associated input lenses 702 optically coupled to optical inputs 701. Input lenses 702 are optically coupled to a plurality of thermo-optic prisms 703 which are optically coupled to an output lens 704. Output lens 704 is coupled to a plurality of optical outputs shown collectively at 705. System 700 having thermo-optic prisms 703 further includes a thermal element (not shown) for providing a temperature differential for thermo-optic prisms 703. During use a thermal element may provide a temperature differential to system 700 such that optical signals incident to optical inputs 701 may be diffracted or switched to a desirable optical output at optical outputs 705. For example, thermo-optic prisms 703 may include materials such as polymer and silica having thermo-optic coefficients that may be operable to provide a desirable diffraction of an incident signal to system 700. As such, a thermal element providing a temperature differential to thermo-optic prisms 703 may diffract an optical signal incident to optical inputs 701 to a desirable optical output at optical outputs 705. Further system 700 having of a plurality of optical inputs 701 may be operable to receive a plurality of input signals incident to optical inputs 701. As such, a plurality of optical inputs incident to thermo-optic prisms 703 may be switched or deflected to a desirable optical output for a given temperature differential.

This limitation is also not taught or suggested by Figure 8 or the description thereof at column 10, line 21, to column 11, line 11[3]. The lenses, of Li et al. 808-811 are separate and distinct from each other and from the system of multiple discrete prisms 812-820. These individual prisms are in turn separate and distinct from lens 813. Thus, the optics shown in Figure 8 are not "protruding outwardly from and integral to an optical surface of the optical bend prism."

Accordingly, Li neither teaches nor suggests the invention recited in claims 1-4.

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[3] FIG. 8 is a schematic drawing showing an isometric view of a thermo-optic N.times.N deflection system in accordance with the teachings of the present invention. System 800 may be fabricated in a plurality of ways such as utilizing conventional semiconductor process techniques. System 800 includes a cladding layer 802 coupled to a substrate 801. A waveguide layer 803 may be coupled to cladding layer 802 for communicating optical signals. Waveguide layer 803 includes a first optical input 804, a second optical input 805, a third optical input 806, and a fourth optical input 807. First optical 804 includes a first input lens 808, second optical input 805 includes a second input lens 809, third optical input 806 includes a third input lens 810, and fourth optical input 807 includes a fourth input lens 811. In one embodiment optical input lenses 808, 809, 810, 811 may be configured as concave lenses operable to optically communicate a signal incident to optical inputs 804, 805, 806, 807 respectively.

System 800 further includes a first optical array 812 and a second optical array 820 optically coupled to input lenses 808, 809, 810, and 811. First optical array 812 and second optical array 820 include a first region 818 comprised of a first material and a second region 819 comprised of a second material. In one embodiment, first region 818 may include a material such as polymer and second as region 819 may include a material, the same material as waveguide layer 803. As such, a change in temperature of first optical array 812 and/or second optical array 820 may provide a modulated index of refraction for first region 818 and second region 819 operable to alter as an optical path in response to a change in temperature. System 800 further includes an output lens 813 optically coupled to first optical array 812 and second optical array 820 and first optical output 814, second optical output 815, third optical output 816, and fourth optical output 817.

As illustrated, first optical array 812 and second optical array 820 are oriented opposite to one another. For example, each optical array may include a plurality of regions 818 formed substantially as prisms and opposing one another. Region 818 within second optical array 820 may be positioned such that a prism 818 within first optical array 812 will be oppositely oriented. As such, system 800 advantageously allows a signal to be deflected to one of the optical outputs 814, 815, 816, and 817 while minimizing the overall site of system 800.

During use system 800 may deflect an incident optical signal in response to a change in temperature. For example, an optical signal may be incident to first input 804 and optically coupled to first optical array 812 and second optical array 820 through first input lens 808. A temperature differential may be provided to first optical array 812 and second optical array 820 such that the optical signal incident to first optical input 804 may be diffracted or switched to a desirable output such as fourth optical output 817. As such, an incident signal to one of the optical inputs may be switched to a desirable optical output through providing a temperature differential to first optical array 812 and second optical array 820.

Claim 19. Jun neither teaches nor suggests the invention claimed in amended claim 19. As amended, claim 19 now recites:

> A prism used in an optical link module which deflects light beams in an information processor, comprising:
>
> at least two optical surfaces through which the light beams pass; and
>
> aspherical concave lenses protruding outwardly from and integral to an optical surface of the optical bend prism formed on the optical surfaces and include a plurality of coaxial spherical surfaces with different radii.

The lens elements shown by Ju are convex elements and not "aspherical concave lenses protruding outwardly from and integral to an optical surface of the optical bend prism formed on the optical surfaces" and nor does the element shown in Ju Figures 6A, 6B, 6C, or 7 show "a plurality of coaxial spherical surfaces with different radii."

Nor is there any description of "aspherical concave lenses protruding outwardly from and integral to an optical surface of the optical bend prism formed on the optical surfaces and include a plurality of coaxial spherical surfaces with different radii" in Ju, column 5, line 24 to column 6, line 46.

Thus neither Li nor Ju teaches or suggests Applicants' claimed invention.

Conclusion

Based on the above discussion, it is respectfully submitted that the pending claims describe an invention that is statutory subject matter and is properly allowable to the Applicants.

If any issues remain unresolved despite the present amendment, the Examiner is requested to telephone Applicants' Attorney at the telephone number shown below to arrange for a telephonic interview before issuing another Office Action.

Applicants would like to take this opportunity to thank the Examiner for a thorough and competent examination and for courtesies extended to Applicants' Attorney.

Respectfully Submitted

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